

## High School Math Transition Course Scope and Sequence as of 7/31/20

Real-World Contexts	Title of Lesson	Short Description	Math Practice Standards	Ohio Learning Standards	Remediation Free Standards	Number of 45-minute classes	Number of 90-minute classes
Theme 0: Problem Solving: Introduction to the Mathematical Practices							
	Introduction	The first few weeks concentrate on fostering a growth mindset in students and expose them to problem-solving strategies.	all			17	8.5
Day 1	Collaboration – Marshmallow Challenge	Students will work with groups to complete the Marshmallow Challenge.	MP.1			1	0.5
Day 2	Collaboration	Students will have a game where they can find the most numbers in order. The class will then to start to establish classroom norms surrounding collaboration.	MP.7			1	0.5
Day 3	Launching a Lesson	This task sets the routine of launching lessons using the “I notice, I wonder routine.”	MP.1			1	0.5
Day 4	Mindset Survey	Students take the mindset survey and then practice their noticing and wondering in the context of a 3-Act Task	MP.1			1	0.5
Day 5	Mathematical Mindset: Promoting Productive Struggle and Perseverance	Students will learn about and experience productive struggle and perseverance by watching the tiger video and starting Noah’s Ark task.	MP.1			1	0.5
Day 6	Mathematical Mindset: Making Mistakes	Students use the Four 4’s task to continue problem solving emphasizing equivalence and learning about factorials.	MP.7			1	0.5
Day 7	QRLA	Students in Cohort 19 complete a pre-assessment				1	0.5
Day 8	Overview of the Mathematical Practices & Number Talks	Students will learn about the importance of using different representations by doing a Dot Plot. Then students will use the jigsaw method to explore the standards of mathematical practices.	MP.1 MP.2 MP.3 MP.4 MP.5 MP.6 MP.7 MP.8			1	0.5

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Day 9	Communication, Reasoning, and Precision	Students will use Number Talks and Fermi Problems to communicate their reasoning to other and defend their own reasoning and critique the reasoning of others.	MP.2 MP.3 MP.6			1	0.5
Day 10	Communication, Reasoning, and Precision	Students will use Number Talks and Fermi Problems to communicate their reasoning to other and defend their own reasoning and critique the reasoning of others.	MP.3 MP.6 MP.7			1	0.5
Day 11	Convincing, Defending, and Proof	Students explore proof in the context of trying to convince someone of their hypothesis as a defendant and being a skeptic (prosecutor) of other's hypothesis.	MP.3			1	0.5
Day 12	Use Tools Strategically and With Precision	Students analyze all the mathematical tools available at their disposal including benefits and drawbacks.	MP.1 MP.5			1	0.5
Days 13-16	Modeling	Students use the Spy, Analyze, Model routine to model the Driving for Gas problem.	MP.1 MP.2 MP.3 MP.4 MP.6			4	2
Day 17	Accuplacer	Students in Cohort 19 complete a pre-assessment				1	0.5
<b>Total:</b>						<b>17</b>	<b>8.5</b>

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<b>Theme 1: Number and Quantity</b>							
Context 1	Farm Co-op Swap Meet	Students explore dimensional analysis and perform single and multiple unit conversions. They construct viable arguments as to why their calculations are correct and critique the reasoning of others.	MP.1 MP.3 MP.5 MP.7	N.Q.1	MP.PS.C MP.PS.D MP.CMI.A MP.CMI.C MP.CM.I. B MP.AUTT. A NO.SNS.A NO.O.D	2	1
	Reinforcement Activities	QR, Unit Conversion/Estimation Unit analysis, dimensional analysis - Temperature - Time - Miles per hour to feet per sec AQR: Section 2				1	.5
Context 2	Planning a Road Trip	Students will choose a destination and plan a trip with the following requirements. Each group will be given a budget limit. Students will create a spreadsheet and a presentation.	MP.2 MP.3 MP.5 MP.6	N.Q.1 N.Q.2 N.Q.3 A.CED.1a F.BF.1	MP.PS.C MP.PS.D MP.CMI.A MP.CMI.B MP.CMI.C MP.AUTT.A MP.AUTT.B MP.AUTT.C NO.O.D	4	2
Context 3	Remodeling the Classroom	Students develop a cost estimate for remodeling the classroom. The remodel includes running a gas line, new carpet, and paint.	MP.1 MP.5	A.CED.1a F.BF.1 G.MG.3 S.ID.9	MP.PS.A MP.PS.D MP.AUTT. B A.G.C A.FA.E	5	2.5

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					G.M.E		
	Reinforcement Activities	Area and Perimeter QR, Measurement and Reasonableness and Composite Area and Perimeter Percentages and rates AQR: Section 5				2	1
Context 4	Gears	Students are introduced to the way bicycle gears work and the relationships between the sizes of front and rear gears, gear ratios and relative speeds of the bicycle wheels. Students later list gear combinations and ratios for bicycles of different speeds.	MP.1 MP.3 MP.4 MP.6 MP.7	G.MG.3	NO.O.D MP.CPC. B	2	1
	Reinforcement Activities	Ratios and Proportions and Scale AQR: Section 5				1	0.5
	<b>Assessment</b>					1	0.5
<b>Total:</b>						<b>18</b>	<b>9</b>

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<b>Theme 2: Functions – Part 1</b>							
Context 5	Ramps	MP 1 MP 2 MP 4 MP 5 MP 7	N.Q.3 S.ID.C.7 G.SRT.C.8	MP.PS.D MP.AUTT. A NO.O.A	MP 1 MP 2 MP 4 MP 5 MP 7	6	3
	Reinforcement Activities	Slope – Percent of grade of hill on road  Scatter plots Technology (graphing calculator or dynamic software)				1	0.5
Context 6	Bungee Drop (Complete either Context 6 or Context 7)	Using experimental design and mathematical modeling, students will collect, organize, and analyze data to construct a bungee cord, which can provide an optimal jump from a specified height.	MP.1 MP.5	A.CED.2a F.IF.4a F.BF.1ai S.ID.6	MP.PS.D MP.CMI.C MP.AUTT.A MP.AUTT.B A.EI.D A.FA.E A.OAO.C PS.RUD.A	4	2
	Reinforcement Activities	QR, measurement, dimensional analysis, different representations of functions (graphical, written, analytic, tabular)				1	0.5
Context 7	How Many Can You Grab? (Complete either Context 6 or Context 7)	This activity is a linear regression activity. Students measure the distance from their thumb to their pinky. Then they reach into a bowl of Starbursts and try to get the largest handful they can. It turns out that the data is linear. Students interpret the slope and $y$ -intercept and decide when the $y$ -intercept is useful. They decide which measurement of the hand will be the best predictor, in hopes that it will spark a better understanding of correlation.	MP.1 MP.4 MP.5	S.ID.6 S.ID.8	MP.CMI.B PS.RUD.A	3	1.5

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	Reinforcement Activities	Linear regression, slope, and $y$ -intercept, graphing linear functions				2	1
Context 8		Calculator work such as linear regression & scatterplot prior to Context 6					
	Follow the Bouncing Ball	Students use experimental design and mathematical modeling to collect, organize, and analyze data and construct a model which describes the functional relationship between initial drop height and height of first bounce.	MP.1 MP.2 MP.3 MP.4 MP.5 MP.6	A.CED.2 A.CED.3 F.IF.4 F.IF.6 S.ID.6 S.ID.8 S.ID.9	MP.PS.A MP.PS.D MP.AUTT.B MP.CMI.A MP.CMI.B MP.CMC.A A.EI.D A.FA.E A.OAO.C A.G.A PS.RUD.A PS.RUD.C	5	2.5
	Reinforcement Activities	QR, measurement, functional relationships, independent and dependent variables, domain and range in context, scatterplots, predictor value, modeling-extrapolation, solving linear equations				2	1
Context 9	Graphing Inequalities	Students will shade regions of a map to consider inequalities. Students will create visual descriptions of discrete combinations that describe a solution set for a real life inequality. Finally, students write the algebraic representation of systems of linear equations.	MP.1 MP.2 MP.4 MP.5 MP.6 MP.7 MP.8	A.REI.12	MP.PS.B MP.CUMI.A MP.CMC.A MP.AUTOT.A MP.AUTOT.C A.EI.D A.G.A A.G.C	3	1.5
	Reinforcement Activities						
Context 10	Which Cell Phone Plan Should I Choose?	Students will review their knowledge of different types of functions and their multiple	MP.1 MP.2	A.REI.6 A.REI.10	MP.PS.A MP.PS.D	2	1

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		representations through the context of choosing cell phone plans that best fit their families' needs.	MP.3 MP.4 MP.5	F.LE.1 F.LE.3 F.LE.5	MP.AUTT.B MP.CMI.B MP.CMC.A A.EI.B A.EI.D A.FA.E A.OAO.C A.G.A PS.RUD.A		
	Reinforcement Activities	QR, solving non-linear equations algebraically and graphically, solving systems of nonlinear equations graphically, solving inequalities using domain and range in context.				1	0.5
	<b>Assessment</b>					1	0.5
					<b>Total</b>	<b>26</b>	<b>15.5</b>

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<b>Theme 3: Functions – Part 2</b>							
Context 11	Catapult Project	Students create a small catapult with craft sticks, use it to project marshmallows, then measure the distance traveled and the time the marshmallow was in the air. They then write a quadratic function describing the height of the marshmallow as a function of the time in the air.	MP.1 MP.4 MP.5 MP.7	A.CED.1 F.IF.4	MP.PS.D MP.CMC.B A.G.E A.G.F A.G.I A.G.J	5	2.5
	Reinforcement Activities						
Context 12	Modeling Cancer Cells with M&M's	The purpose of this activity is to provide a simple model to illustrate exponential growth of cancerous cells.	MP.4 MP.7	A.CED.2c F.LE.1 F.LE.2	MP.PS.D MP.MR.D A.EI.B A.FA.A A.FA.B A.FA.E	3	1.5
	Reinforcement Activities	QR, exponential and logarithmic growth by solving graphically and analytically				1	0.5
Context 13	Skid Mark Trial	Using experimental design and mathematical modeling, students will collect, organize, and analyze data to construct a Model to predict the speed of a car based upon the length of the skid marks the car left when braking. The students will then prepare an argument based on their model as to whether a driver was exceeding the speed limit or not.	MP.1 MP.2 MP.3 MP.4 MP.5 MP.6	A.CED.2 A.CED.3 S.ID.6	MP.PS.A MP.PS.D MP.AUTT. B MP.CMI.A MP.CMI.B MP.CMC.A A.EI.D A.FA.A A.FA.E	4	2
	Reinforcement Activities	QR, roots as a subset of power functions				1	0.5
	Reinforcement Activities (Balloons and Breaths)	A data collection activity for Power Functions.					
Context 14	The Big Fish Story	Students use a spreadsheet to gain understanding of linear difference equations and equilibrium for a stocked pond.	MP.1 MP.2 MP.4	N.Q.1 N.Q.2 N.Q.3	MP.PS.A MP.PS.D MP.AUTT.B	5	2.5



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			MP.5 MP.6 MP.7 MP.8	A.CED.2c A.CED.3a F.IF.3 F.IF.9 F.BF.1c F.BF.2	MP.CMI.A MP.CMI.B MP.CMC.A MP.MR.D NO.SNS.A NO.O.B A.EI.D A.EI.F A.G.A A.FA.A A.FA.B		
	Reinforcement Activities	QR, recursive sequences on a spreadsheet, arithmetic and geometric sequences				3	1.5
	<b>Assessment</b>					1	0.5
<b>Total:</b>						<b>23</b>	<b>11.5</b>

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<b>Theme 4: Geometry</b>							
Context 15	Design Logo (Circles)	Students will design a logo using circles and transformations to investigate symmetry and circumference and area of irregular figures.	MP.1 MP.4 MP.5 MP.7 MP.8	G.CO.2 G.CO.3 G.CO.5 G.CO.12 G.C.5	G: M: C G: GR: C G: GR: D	5	2.5
	Reinforcement Activities					1	0.5
Context 16	Working with Triangles	Students are presented with two worksheets that will require the students to investigate angles and side lengths using similar triangles and the Pythagorean Theorem in the context of the problem.	MP 1 MP 2 MP 3	G.SRT.4 G.SRT.5 F.BF.1 F.IF.7	MP.PS.B MP.PS.D NO.O.D G.S.B G.S.D	2	1
	Reinforcement Activities					1	0.5
Context 17	Mini-golf Design	Students will work in groups to design a miniature golf course. Each student in the class will be responsible for designing one of the holes that will be used for the course with the goal to design a hole that is challenging as well as creative. Students will then create an instructional book describing how to use geometry to get a hole in one.	MP.1 MP.4 MP.5 MP.6	G.GMG3 G.GMD1 7.G.1a 7.G.6	MP:PS:A MP:PS:D G:S:B G:S:D G:R:B G:M:B G:M	4	2
	Reinforcement Activities					1	0.5
Context 18	Triangle Centers	Students will explore the centers of triangles to find the balance point of a Doritos™ brand chip and will use city maps to build their knowledge of the applications of points of concurrency. Constructions (patty paper or compass and straightedge or dynamic software) will allow students to solve real world application problems.	MP.1 MP.2 MP.3 MP.4 MP.5 MP.7	G.CO.10 G.CO.12 G.MG.1	MP.CMI.A MP.CMC.A MP.AT.A MP.AT.C G.S.B	2	1
	Reinforcement Activities	TBD				1	0.5
	<b>Assessment</b>					1	0.5
<b>Total:</b>						<b>18</b>	<b>9</b>

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<b>Theme 5: Statistics</b>							
Context 19	Misusing Statistics	Students will look at various graphs that are manipulated to convey a message. Then students will create their own misleading graphs.	MP.2 MP.3 MP.6	S.ID.3 S.ID.7 S.ID.8 S.ID.9 S.IC.1 S.IC.6	TBD	1	0.5
	Reinforcement Activities	Reading and interpreting graphs				1	0.5
Context 20	Flinging Frogs	Students will fling toy frogs to collect data in order to gain an intuition about measures of spread using a dot plot.	MP.2 MP.4 MP.5 MP.6	S.ID.1 S.ID.2 S.ID.3 N.Q.2 N.Q.3	MP.CMC.A MP.AUTT.A MP.CMI.A MP.CMI.D PS.DDI.A PS.DDI.B	4	2
	Reinforcement Activities	TBD				2	1
Context 21	M&M's Sampling Distributions	Use data collection to gain intuition about proportional reasoning, sampling distributions, and Central Limit Theorem. (Level B. Also see STEW)	MP.1 MP.2 MP.4 MP.5 MP.6	S.ID.1 S.IC.1 S.IC.3 S.IC.4 S.IC.6	MP.PS.D MP.AUTT.B MP.CMI.A MP.CMC.A PS.DDI.A PS.DDI.B	3	1.5
	Reinforcement Activities	AQR book Section 18 2 videos (see Context 11 lesson plan)				1	0.5
Context 22	What Does the Normal Distribution Sound Like (STEW)	Students investigate the rate of change when popping microwave popcorn. They will summarize data using histograms, and approximate a normal curve for the relationship between the rate of popping and shape of distribution. The effects of human error in data collection will be discussed (Level B)	MP.1 MP.2 MP.4 MP.6 MP.7	S.ID.1 S.ID.4	TBD	3	1.5
	Reinforcement Activities					1	0.5

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Context 23	NFL Quarterback Salaries	Students will set up a statistical question to explore how to interpret a linear regression equation the correlation coefficient for a relationship between two quantitative variables in the context of NFL salaries. Students need to demonstrate an understanding of correlation vs causation. (STEW Level C)	MP.4 MP.7	S.ID.6 S.ID.7 S.ID.8 S.ID.9		2	1
	Reinforcement Activities	TBD				1	0.5
Context 24	Colors Challenge (STEW)	Students design and perform an experiment mimicking the Stroop Effect. Five Number Summaries and box plots are used to summarize the data. (Level B)	MP.1 MP.2 MP.3 MP.4 MP.5	S.ID.1 S.ID.2 S.ID.3 S.IC.1 S.IC.5		2	1
	Reinforcement Activities	TBD				1	0.5
Context 25	Are Double stuffed Oreos actually Double Stuffed?	Collect data to determine sample size, extrapolation, graphical representation of categorical data. (Level C STEW)	MP.1 MP.2 MP.3 MP.4 MP.5 MP.6	S.ID.1 S.ID.2 S.ID.3 S.IC.1 S.IC.5	TBD	2	1
	Reinforcement Activities	TBD				1	0.5
	<b>Assessment</b>					1	0.5
					<b>Total</b>	<b>26</b>	<b>13</b>

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<b>Theme 6: Probability</b>							
Context 26	Coke vs Pepsi Challenge	Theoretical vs Experimental Probability	TBD	TBD	TBD	2	1
	Reinforcement Activities	TBD				1	0.5
Context 27	Free Throws for the Win	In this three act task, students will ask and answer questions about the probability that a basketball player will make three free throws in a row to win an NCAA tournament game.	MP.1 MP.2 MP.3	S.CP.1 S.CP.4 S.CP.5	PC.B PC.C	1	0.5
	Reinforcement Activities	TBD				1	0.5
Context 28	Random Babies	Students will run a simulation of a random situation, generate probability distribution graphs, and calculate probabilities. In part one of the lesson, students will use note cards to collect data and in part two an applet will be used to generate 1000 trials.	MP.1 MP.4 MP.5	S.MD.1 S.MD.3 S.MD.4	PS.DDI.A PS.PC.C	2	1
	Reinforcement Activities	TBD				1	0.5
Context 29		Independent Events vs. Dependent Events, notation including $P(A B)$ for Independent   Dependent Events, Finding Probability on a two way table and Venn Diagram.				1	0.5
	Thinking about False Positives	Students will analyze the probability of getting a false positive when being screened for cancer. They will then discuss whether cancer screenings are useful.	MP.1 MP.2 MP.4 MP.6	S.CP.3 S.CP.4 S.CP.5 S.CP.6	MP.PS.A MP.PS.D MP.CMI.A MP.CMC.A PS.DDI.A PS.PC.B	2	1
	Reinforcement Activities	TBD				1	0.5
	<b>Assessment</b>					1	0.5
					<b>Total</b>	<b>13</b>	<b>6.5</b>

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<b>Theme 7: Applications of Number and Quantity and Statistics</b>							
Context 30	Loan Project	Students will develop a pamphlet or handout suitable for a community organization that describes the mathematics involved in loans, with the purpose of promoting financial responsibility. Students will study different types of loans and create a product to showcase their understanding.	MP.1 MP.2 MP.4 MP.5 MP.6	N.Q.1 N.Q.2 A.SSE.3c A.CED.2 A.CED.3 A.CED.4 F.LE.2 F.BF.1 F.IF.6	MP.PS.A MP.PS.D MP.AUTT.B MP.CMI.A MP.CMC.A NO.O.A NO.O.C A.OAO.A A.FA.A A.FA.E	5	2.5
Context 31	Carnival Games	Students will use their creativity and knowledge of probability to develop games of chance for other students to play. The topics of empirical and theoretical probability are also explored as students calculate the expected value of their games.	MP.1 MP.3 MP.4	S.MD.3 S.MD.4 S.MD.5	MP.PS.B MP.PS.C MP.PS.D MP.CMC.A PS.PC.C	5	2.5
Context 32	Inflation and Consumer Price Index	Students will explore the consumer price index and inflation. Students will learn how to calculate past and future costs of goods and services, how inflation impacts different groups of people (e.g., savers and retirees), and how U.S. inflation rates have changed during the past 100 year.	MP.3 MP.5	A.CED.1c A.CED.2c A.CED.3a A.CED.4d	MP.PS.A MP.PS.B MP.PS.C MP.PS.D MP.CMI.D MP.CMC.A	6	3
Context 33	Public Policy	Students will explore the effects of China's one child policy on its economy and population using simulation. Students will compare population of several countries and ultimately analyze if China needed to implement the one child policy.	MP.3 MP.5	S.IC.1 S.IC.6	MP.PS.A MP.PS.B MP.CUMI.B MP.CUMI.C MP.CMC.A	4	2
	<b>Assessment</b>						
					<b>Total</b>	<b>20</b>	<b>10</b>

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Theme 8: Wrap-Up							
	How do I use Math in my Future?	3 page essay about college and future career and personal reflection.				2	1
	Mindset Reflection	Mindset Reflection				1	0.5
	<b>Post-Assessment</b>					1	0.5
					<b>Total</b>	<b>4</b>	<b>2</b>
					<b>Grand Total</b>	<b>171</b>	<b>85.5</b>